

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of G BLOCH et al.

Confirmation No. 4962

Application No. 09/820,562

Group Art Unit. 1771

Filed March 29, 2001

Examiner. D. Zirker

For: PRESSURE-SENSITIVE PAPER-  
PLASTIC FILM LAMINATE TAPE

Attorney Docket No.: 82017-3700

RULE 132 DECLARATION OF ARNOLD B. FINESTONE, PH.D.

Commissioner for Patents  
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Sir:

1. I am a US citizen residing at 2400 Presidential Way, West Palm Beach, Florida. I have a Ph.D. in Polymer Chemistry and over 35 years experience in the field of plastic film products with special experience in paper-plastic lamination for over 15 years. I am submitting this declaration as opinion evidence of what is known by a skilled artisan in this field.
2. The present application relates to a paper-plastic film laminate comprising a paper layer, a water-impermeable oriented plastic film layer having a first corona-discharge treated surface, which is adhesively cold laminated to the paper layer to form a paper-plastic film laminate having first and second opposed outer surfaces, and an adhesive coating on one of said first and said second outer surfaces, said adhesive coating exposed for use in adhering the paper-plastic film laminate to the various articles, wherein the plastic film layer has a strength sufficient to allow the film to be stripped or removed in one piece from an article to which the laminate is adhered.
3. The Examiner believes that there is no objective evidence in the application as to what "cold lamination" is. As a skilled artisan, I strongly disagree with that comment

4. In my opinion, the specification clearly describes and sets forth the necessary details for carrying out a cold lamination process. Specifically, the specification discloses and the claims recite that

the plastic film is oriented to increase its strength,

the plastic film is energized prior to application of adhesive thereto,

a water-based adhesive is applied to the energized surface of the film rather than to the surface of the paper web; and

an adhesive, i.e., a pressure sensitive adhesive, is applied to one of the surfaces of the laminate. The first three steps disclose a cold lamination process. By following these steps, the formation of the laminate is instantaneous when the adhesive bearing film and paper webs contact and pass through the nip of a pair of compression rolls; and the resulting plastic-paper or paper-plastic-paper laminate retains the oriented properties of the polymer in order for the laminate to exhibit exceptional tear and burst characteristics.

5. The cold lamination process produces a product where the oriented plastic film is adhesively cold laminated to the paper layer. The resulting plastic-paper laminate retains the oriented properties of the polymer in order to exhibit exceptional tear and burst characteristics. The adhesive is applied to the laminate to enable it to be adhered to various articles, such as packages, and, if desired or required, can subsequently be removed from the article in one piece.

6. The parent application teaches that the type of adhesive is not critical to the invention, but that it must be a water-based adhesive. On page 6, ll.22-29, the specification discloses examples of water-based adhesives that could be used according to the invention are provided. This teaches the skilled artisan that a water-based polyacrylate copolymer, ethylene vinyl acetate copolymer or any water-based adhesive having similar bonding properties and having an affinity both for the paper sheet and the plastic film can be used. I understand what adhesives to use based on that section, as well as what types of adhesive would not be useful. The latter would include adhesives that set or cure by reaction of components over time or by the addition of heat and pressure over time. The skilled artisan is readily able to select or conduct routine tests to determine the appropriate type and amount of water-based adhesive to use depending upon the specific types and weights of film and paper to be laminated together.

7. The present invention has been conducted with papers ranging from a weight of 6 pounds per 3000 square feet of paper to 120 pounds per 3000 square feet or higher, i.e., from "tissue" paper to cardboard. The only limitation on the paper is that it be sufficiently flexible to be taken up by a collection roller to produce laminates at high speeds of 150 to 500 feet per minute or more. One can conduct routine tests to easily determine the optimum amount of adhesive (and water content) based on the specific weight and grade of paper used so that lamination can be achieved as described in the patent application.

8. I see that claims 16-30 were rejected as being unpatentable over either Williams patent (i.e., US patent 4,351,877 (the '877 patent) and US patent 4,557,971, (the '971 patent)) in view of the US patent 4,636,427 to Ohno et al. (the Ohno patent) for the reasons of record. These references do not teach or disclose the presently claimed invention. None of these references discloses a cold laminated paper to plastic laminate. As noted above, cold lamination is a product feature, and it is the result of a cold laminating process. The specification discloses that a cold laminated product has structural features in that the oriented plastic film is bonded to the paper without loss of strength of the film and with a secure bond. This type of bond is not possible with other adhesives that were previously used in the art, such as hot melt adhesives, pressure sensitive adhesives, or reaction cure adhesives.

9. Specifically, "cold laminated" describes the product that results from a cold laminating process, and defines certain properties of the laminate sheeting. The claims recite that the film is of a synthetic, oriented plastic material. A cold lamination of these oriented films and papers enables the orientation of the oriented films to be maintained in an unimpaired state and this contributes to the tear resistance and burst strength of the laminate sheeting. In contrast, a heat sealed or hot melt adhered paper and plastic film laminate would not retain the oriented properties of the plastic film since the heat used in the heat sealing or hot melt adhesive adhering operations would result in a product in which the film has weakened or relaxed portions due to the exposure to heat. Also, due to the relatively long time required for the hot melt adhesive to set, or for that matter, other adhesives that require long curing times, the oriented plastic film can relax, shrink or move and cause irregularities in the final laminate. It is important to recognize here is that the resulting product is a structure, namely, a joined paper-plastic laminate, and this is true whether it is obtained by heat sealing, hot melt adhering, reactive adhesive curing, or cold laminating. A cold laminated product, however, provides unexpected benefits compared to the other forms of

laminating paper and plastic. These terms define the structure that results from the method rather than the method step itself.

10. The Examiner's comments regarding the lack of objective evidence of the cold laminated product is incorrect. The present application clearly discloses how to conduct a cold lamination process as well as how to obtain a cold laminated product (see page 6, line 23 to page 7, line 29). Furthermore, the present application is a continuation of the application which has issued as U.S. patent 6,235,386 and contains the identical disclosure. Thus, support for the present by claimed laminate is fully provided by the '386 patent. The '386 patent is a continuation-in-part of U.S. patent 5,962,099, and the disclosure which supports the present claims can be found at col. 2, line 54 to col. 3, line 52. The '099 patent is a continuation-in-part of application 07/975,080 filed November 12, 1992, and the claimed laminate is supported by pages 10-12. Thus, the presently claimed invention is disclosed and supported to as early as at least November 12, 1992.

11. Furthermore, none of the prior art references cited in this prosecution or known to applicants disclose an adhesive bearing cold lamination product as claimed in this application. A laminate made by a cold lamination process whereby an energized plastic film is joined to paper by a water-based adhesive provides unexpectedly improved properties compared to other laminates. These advantages include the retention of the oriented properties of the film after lamination. A laminate made by cold lamination also produces a very strong bond between the plastic film and the paper due to the energizing of the plastic surface and the use of the water-based adhesive. The cold lamination process also results in excellent alignment, adherence, and dimensional stability between the paper and plastic because of the instantaneous set of the adhesive due to absorption of the water of the adhesive by the paper. These unexpected advantages support the patentability of the present claims.

12. In contrast, laminates of paper and plastic made by other joining techniques are subject to different problems. For laminates made using pressure sensitive adhesives, the adherence of a strong bond is not possible due to air bubbles or an entrainment between the sheets. Additionally, when the pressure sensitive adhesive contacts another portion of that adhesive, they will stick together and cause difficulty in making the laminate.

13 Laminates made using hot melt adhesives face a number of different problems. The temperature of the adhesive can affect the orientation of the film and cause it to relax or lose strength in different areas. These areas also can cause wrinkling or warpage of the laminate. Most importantly, the increased amount of time that is required for the hot melt adhesive to set and cure is sufficiently long to allow the film and paper ply to move relative to each other during further processing before the adhesive sets, this further contributes to the wrinkling and poor dimensional stability of the resulting laminate.

14. Similar problems are experienced with reaction cure adhesives. Again, there is a significant time delay until the adhesive sets and cures, and the sheets can move relative to each other before that occurs. In addition, many if not all of these adhesives require heat to expedite or reduce the curing time, and such heating can cause loss of the orientation of the film. Finally, many of these type adhesives include organic solvents, and this presents environmental problems with regard to cleanup and recovery of such solvents.

15. The Williams '877 patent discloses a laminate of a pre-stretched and oriented plastic film that is joined to a carrier layer of Kraft or other paper by "any adhesive as is commonly used for gluing plastic films to paper, as is known in the art" (col. 3, lines 24-26). There is no disclosure of the type of adhesive that could be used for this purpose, and there is no specific mention of a water-based adhesive or of a cold laminating process for adhering the film to the paper layer. In addition, the Williams '877 patent further discloses that the plastic film provides "virtually all the necessary strength" of the tape, while the paper layer is used "only as a medium to 'carry' the a water-soluble adhesive that otherwise could not be applied to the plastic layer and to provide the longitudinal rigidity to permit the tape to be dispensed (col. 3, lines 30-36). In contrast, the present invention includes a number of structural differences. The treatment of the plastic film surface by corona discharge activates that surface to render it receptive to adhesives. Thus, in our invention, the activated plastic film surface can be adhesively cold laminated to the paper layer. Williams '877 notes that the plastic film cannot receive a water-soluble adhesive, so that there would be no suggestion in the Williams '877 patent to put any adhesive on the exposed surface of the plastic film.

16 The type of adhesive that is used to laminate the plastic film to the paper layer is important in order to retain in the laminate the properties and strength of the oriented film. Notably, Williams '877 is silent on this type of adhesive, but he does recognize that a water-

based adhesive cannot be applied to the plastic layer. Thus, Williams '877 must have used hot melt or reaction curable adhesives as these would adhere to the plastic film. Those types of adhesives, however, affect the properties of oriented film and also present problems in laminating the materials together, since the oriented film could relax while waiting for the hot melt or reaction curable adhesives to set or cure. In addition to a loss of strength, the final product is often warped or curled. Thus, the Williams '877 patent is not relevant to the presently claimed invention.

19. The Williams '971 patent also acknowledges the deficiencies of the Williams '877 patent. In fact, it mentions that the rape of the Williams '877 patent has the problem of lack of adherability of the adhesive containing surface to the outer plastic film surface when the film is overlapped onto itself (see col 1 line 67 to col. 2, line 4). Thus, the Williams '971 patent is directed to the use of a permeable layer, such as paper, that is laminated to the plastic film layer by an adhesive. This adhesive layer is again described as any adhesive as is commonly used for gluing plastic films to paper, as is known in the art. As in the Williams '877 patent, this is not a disclosure of a water-soluble adhesive that can be used to cold laminate an energized plastic film surface to a paper layer. Again, the "prior art" adhesives can lead to previously noted problems of strength loss and warpage of the final product. Also, there is no disclosure that a pressure sensitive adhesive can be applied to the plastic film as in the present invention. Again, it is important to utilize a corona discharge treatment to activate the surface of the plastic film prior to applying the water-soluble adhesive thereto and cold laminating the plastic film to the paper layer as well as prior to the application of the pressure sensitive adhesive to the outer surface of the plastic film.

20. The Examiner's belief that it was known in the art to utilize a corona discharge treatment to improve the surface energy of a plastic film is correct, but the recognition of conducting this step immediately prior to the application of the adhesive is not clearly taught by any prior art reference. Instead, we have discovered the benefits in adhesion that are achieved by subjecting the surface of the plastic film to a corona discharge treatment prior to the application of the water-based adhesive. Others in the art were not aware of the importance of this step as evidenced by the later issued Williams patents.

21. While a product by process is presently claimed, this product cannot be obtained unless a cold lamination process is conducted. Thus, one cannot obtain a cold

lamination wherein there is a strong bond between the oriented plastic film and the paper layer unless the plastic film is energized by corona discharge immediately prior to application of the water based adhesive. If other adhesives are used, or if the activation of the film is achieved at too early a time prior to bonding, the same product cannot be achieved.

22. The Ohno patent is non-analogous art. Ohno is directed to a multi-layer tape product that includes two plastic films and a fabric layer. The plastic layers are adhered to the fabric base by heating the films to over 300°C and then extrusion laminating the heated film to the fabric base. After forming the laminate, a pressure sensitive adhesive is applied to the outer exposed surface of the fabric or one of the plastic layers. While Ohno does disclose the use of a corona discharge treatment, it is only onto the fabric base or onto a non-oriented plastic layer. Furthermore, in Ohno, it is the fabric layer, rather than the plastic layer, that provides strength to the laminate. If the plastic films provided strength, then the resulting laminates would be stiff and not have the necessary feel to imitate a fabric. The resulting tape is not stiff but also lacks strength and is "not usable for applications. . . [such as] for binding packages." (see column 1 line 38 to column 1 line 41). Also, in each case where a plastic layer is used, it is heated as noted above and then subjected to extrusion calendaring for adherence to the fabric base to form the laminate. Thus, the plastic layer cannot be stretched and oriented in the Ohno laminates because the heating step would deleteriously affect the strength properties of such an oriented film or layer. Moreover, even if the plastic layer is somehow stretched while hot, it would likely shrink while cooling to cause warpage in the final laminate. This cannot be tolerated in the product of the present invention.

23. When comparing the Ohno patent with the Williams patents, it becomes clear that these patents solve very different problems and utilize very different processes. The Ohno patent was aimed at providing a tape that had the feel of fabric and that was easily cut by hand and does not provide a great deal of strength to the tape. (see column 1 line 38 to column 1 line 41). On the other hand, the Williams patents were aimed at creating self-adhereable, high strength tapes that allowed consumers to print directly on the outer surface of the tape. (see Williams '971 column 1, line 38 to column 2, line 41). This confirms my view that the Ohno patent is non-analogous art compared to the Williams patents, and therefore there is no motivation to combine the two references.

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24. Finally, I note that the Examiner objects to the wording of Claim 16. Contrary to the Examiner's comment, the present application was re-filed to pursue adhesive bearing laminates regardless of the specific type of adhesive that is used, and consequently we do not wish to limit the claims of our invention to "pressure sensitive sealing tape." To a skilled artisan, the subject matter of the invention is particularly pointed out and distinctly claimed.

25. I further declare that all statements made herein of my knowledge are true and all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

Dated this 5th day of September, 2003.

  
Arnold B. Finestone

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